

## REMARKS

Claims 1-40 are pending. Claims 22-36 and 40 are withdrawn from consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention. Claims 14 and 39 are objected to because of grammar informalities. Claims 5-19 and 39 are rejected under 35 U.S.C. § 112, first paragraph, for not providing enablement for a track planner arranged to associate one or more tracks (or contours) around the perimeter of an object to be machined. The Examiner indicated that Claim 14 would be allowable if it was rewritten to overcome the rejections under 35 U.S.C. 112, first and second paragraph, and include all of the limitations of the base claim and any intervening claims. Claims 1-21 and 37-39 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter the Applicant regards as the invention. Claims 1-3, 21, and 38 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 3,641,872 (the ““872 reference”). Claims 1-7, 21, and 37-38 are rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,833,617 (the ““617 reference”). Claims 1-3, 5-12, 15-21, and 37-38 are rejected under 35 U.S.C. § 102(b) as being anticipated by DE 19624131 and its English-language counter part, U.S. Patent Publication 2001/0043842 (the ““131 reference”). Claim 13 is rejected under 35 U.S.C. § 103(a) as being unpatentable over the ‘131 reference as applied to claims 1, 5, 8, and 12.

The specification is objected to as referring to Figure 4 multiple times and stating that is shows things that it does not. Applicant has amended the specification such that on page 15 (where appropriate) the specification now relates to Figure 5 in place of Figure 4. The references to Figure 7 on pages 14 and 15 were also amended to refer to Figure 8 instead of Figure 7. This is a correction of obvious errors and no new matter has been added in making this amendment.

Applicant has amended claims 14 and 38 as suggested in the Office action. No new matter has been added in making these amendments.

Claims 5 to 19 and claim 39 were rejected as not being enabling. Claim 6 has been amended to recite that the track planner is capable of associating one or more

contours around the perimeter of an object to be machined, where each contour is defined as a line within the track defined in claim 1. While the scope of claim 5 is now included in claim 1, the Examiner will note that it has been amended to recite that the or each track comprises a locus of the paths the material-remover may be controlled along around the object in a single pass, bounded by the minimum and maximum depths of cut. This does not include all possible paths, merely all paths that the material-remover may physically take around the object considering the variation possible in controlling the depth of cut. Corresponding amendments have been made to other claims to which this objection was raised. Applicant submits that this wording is supported by the description at paragraph 1 of page 4 which sets out the wording of previous claim 5 in the context of possible variations in depth of cut.

In paragraph 7 of the Office action, the Examiner rejects claims 1 to 21 and 37 to 39 as being indefinite for failing to point out and distinctly claim the subject matter which applicant regards as the invention. These claims have now been amended to clarify their meaning as is described in greater detail below.

In response to the Examiner's particular objections, claim 1 as amended sets forth that the processing circuitry has the capability of varying the depth of cut in the material-remover.

Regarding the objection to claim 2, the reference to "the machine" is now amended to read "the machine tool." This is considered to be a correction of an obvious error and no new matter is added in making this correction. Claim 10 has been amended to recite that a track comprises an inside edge region and an outside edge region. This addresses the objections to claims 10 and 11 that the terms "inside" and "outside" lacked sufficient antecedent basis. The references to the track in claims 8 to 10 has been amended to recite the or each track, the reference to "the curve" in claim 13 has been clarified to provide sufficient antecedent basis by referring to "each curve." Equally, in claim 13, "the node" has been amended to read "a node" to bring it into line with the language of claim 12. Equally, the radius referred to in claim 14 has been clarified as the radius of one or more of the or each curve.

The Examiner notes that these examples are not the only instances where correction is required. The text of claims 16, 17, 18, 19, 23, 25, 27, 28, 29, 31, 32, 33, 35, 37, 39, and 40 have been amended to clarify their meaning and to ensure that the terms used have sufficient antecedent basis.

The Examiner further objects that claim 5 is unclear whether the reference to the “object to be machined” is different from the previously described “material that is being processed.” Although the scope of this claim is now included in claim 1 and claim 5 deleted, the wording has been clarified.

Claim 7 has been amended to recite that the track planner is capable of producing tracks of variable width.

Claim 8 has been amended to depend on claim 1 to provide sufficient antecedent basis for the or each track and/or contour. It is submitted that this addresses the similar problem in claim 9.

Claim 9 has been amended to recite nodes in place of points. This is believed to be the correction of an obvious error and no new matter has been added in making this amendment.

Claim 14 has been clarified with regard to the reference to “one or more curves.” Claim 16 has been cancelled, as has claim 32 that both contained the term “close.”

In claim 18, the word “it” has been amended to read “the path.” In claim 37, the words “it to function” have been replaced by “the machine tool to be controlled.” This is intended to clarify the meaning of the claim. This also addresses the Examiner's objection that claim 37 is unclear.

In paragraph 8 of the Office action, the Examiner notes her opinion that she does not believe that the invention is novel. In paragraph 9, the Examiner cites the '872 reference as anticipating claims 1-3, 21, and 38. Claim 1 has now been amended to incorporate the scope of claim 5. The Examiner was of the opinion that claim 5 was not anticipated by the '872 reference. Therefore, the rejection of claims

1 and the claims that depend on claim 1 are considered overcome. Claim 38 has been withdrawn.

In paragraph 10 of the Office action, the Examiner suggests that claims 1-7, 21, 37, and 38 are anticipated by the '617 reference. The '617 reference, however, does not teach that any path other than the cutting path is considered. The Examiner cites the disclosure of Figure 5 the '617 reference against claims 5 and 6. It is believed that this figure simply shows a machine tool cutting away the material to produce a desired shape. The device disclosed in the '617 reference does not consider constraints such as the various depths of cut possible before planning which path it should take. Claim 1 as amended includes the clarified scope of claim 5 (which has been limited from all possible material-remover paths to all physically achievable such paths), and is therefore considered novel. As discussed in the introduction of the present application, calculating a path for the material-remover is necessary before an object can be machined. Determining methods that can increase the efficiency of the path planning, as is the case with the method disclosed in the present application, are desirable. Calculation time is reduced, the object is machined quicker and the material-remover may be less likely to suffer damage.

Further, claim 1 as amended recites varying the depth of cut to maintain the particular speed of the material-remover. This amendment is supported by page 19, lines 6-11, particularly the line that reads "Thus, the paths 64 allow the velocity of the material-remover 14 to be maintained by varying the depth of cut." As the skilled person will appreciate, the load on the material-remover is proportional to its speed and to its depth of cut. When the load is increased at a corner, reducing the depth of cut allows the speed to be maintained. The '617 reference discloses using an adaptive feedrate which is related to the rotational speed of the cutting tool. The feedrate is decreased when the load on the tool is high, and vice versa (see claim 1 of the '617 reference). The depth of cut is set by the shape of the object to be machined (see column 3, lines 9-36). This therefore solves the problem of how to keep the load on the tool head within acceptable limits in a different way to the present invention. In summary, the '617 reference teaches to reduce the feedrate, i.e., rotational speed of the cutting tool, when the load increases, for example as the depth of cut increases. The present invention teaches that a shallow cut should be

made at a corner, where loads are increased, to maintain cutter speed. Thus, the teachings of the '617 reference teach away from the claimed subject matter.

Claim 2-7, being dependent on amended claim 1 also require that a track is calculated then a path selected from within that track, and are considered novel and inventive over the disclosure of the '617 reference.

Claim 21, being dependent on the amended novel and inventive claim 1 is considered novel and inventive, as is claim 37.

In paragraph 11 of the Office action, the Examiner rejects claims 1-3, 5-12, 15-21, and 37-39 as being anticipated by the '131 reference or its equivalent U.S. Patent Publication 2001/0043842. The '131 reference relates to a method of manufacturing an embossing plate which is subject to different requirements and uses and provides a different service than the 'roughing' process of the embodiments of the invention. Regarding claims 5 (now deleted) and 6, the Examiner notes that the tool path is determined within a perimeter or contour and highlights Figure 5. The applicant submits that there is no consideration of a track comprising the locus of the possible paths as the capability of the cutting tool, and in particular the possible variation of depth of cut, is not considered. In the '131 reference, the depth of cut is determined by the volume of ink the cut track is intended to hold (see paragraph 32). Since the scope of claim 5 has now been included in claim 1 and clarified to limit all possible material-remover paths to a locus of paths that the material-remover can be controlled along, it is believed that this claim and all the claims dependent thereon are novel and inventive. Further, the '131 reference does not recite reducing this depth of cut to maintain cutter speed, as recited by amended claim 1. Claim 37, which is dependent on amended claim 1, is now also novel and inventive. Claim 38 is withdrawn. Further, as claim 39 is of similar scope to amended claim 1, it is believed that the claim, as clarified by amendment, is novel and inventive over the disclosure of this document.

In paragraph 12 of the Office Action, the Examiner suggests that some of the claims are not inventive. In paragraph 13, the Examiner cites the '131 reference as making claim 13 obvious. Applicant submits that this is not the case. As a first point, the '131 reference relates to a different field of endeavour. The detailed

engraving of a plate is not the ‘roughing’ or indeed the milling discussed in the present application, and the Applicant submits it would not be obvious to applying teaching from the field of embossing to the field of roughing. Further, claim 13 is dependent on novel and inventive claim 1 and is therefore considered to be novel and inventive. Furthermore, claim 13 relates to the physical capabilities of the machine tool. The ’131 reference makes no reference to considering the physical capabilities of the machine tool in particular as a continuous track is not cut but rather a series of smaller cuts are made. Therefore, the curves associated with the corners, which are intended to plot a path around which the machine tool may be physically guided, is not anticipated. The Examiner believes it would be an obvious matter of design choice to make different portions of the curve whatever size was desired by changing the size of a component, by which the Applicant assumes she means a tool head. While this may be the case, this is not the solution taught by claim 13, which looks at the problem from a different angle. Instead of changing a component the machine to fit inside the curve, the curve is picked to fit the machine. If a different tool head was used then the curve would likely be different. Therefore, this citation does anticipate the claimed subject matter nor make it obvious.

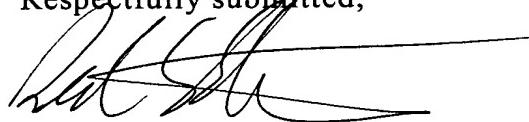
The Applicant thanks the Examiner for the indication of the allowable subject matter in the application. Claim 14 has been amended as suggested.

New claims 41 - 43 have been added. Support for the matter of claim 41 can be found at page 13, lines 17 to 18 and in Figure 9 when considered in conjunction with the cutting tracks shown in Figure 18. Support for the matter of claims 42 and 43 can be found at page 15, lines 1 to 9.

**CONCLUSION**

In view of the foregoing, entry of the amendments and allowance of claims 1-4, 6-25, 27-37, and 39-43 are respectfully requested. The undersigned is available for telephone consultation during normal business hours at (414) 271-6560.

Respectfully submitted,



Derek C. Stettner  
Reg. No. 37,945

File No. 072211-9009  
Michael Best & Friedrich LLP  
100 East Wisconsin Avenue  
Milwaukee, Wisconsin 53202-4108  
(414) 271-6560

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